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AN ANALYSIS OF THE EFFECTS OF OVERCROWDING IN CANADIAN PENITENTIARIES

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INTRODUCTION

There is now a fairly substantial literature relating overcrowding in prisons to a range of negative outcomes. Overcrowding of prisoners has been associated with higher rates of psychiatric commitment (Paulus, McCain, & Cox, 1978), higher rates of illness complaints (Paulus, Cox, & McCain, 1977; McCain, Cox, & Paulus, 1976), increased hypertension (D'Atri & Ostfeld, 1975), an elevated incidence of tuberculosis (Stead, 1978), and an increased likelihood of reoffending after release (Farrington & Nuttall, 1980). Rates of suicide and other forms of violent death have been found to be higher during periods of overcrowding (McCain, Cox, & Paulus, 1980). A number of studies have also reported a relationship between overcrowding and increased rates of assaultive behavior or other disciplinary infractions (Carr, 1980; Jan, 1980; McCain et al., 1980; Megargee, 1977; Nacci, Teitelbaum, & Prather, 1977).

In spite of this evidence attesting to the adverse effects of overcrowding, it is also true that we know very little about how overcrowding actually affects prisons. The processes which may mediate the effects of overcrowding have not been adequately examined, and the conditions under which overcrowding may have the most severe or benign consequences have not been systematically investigated. Correctional agencies have few practical alternatives when faced with the problem of dramatic increases in the size of inmate populations. New institutions

that are built tend to become quickly overcrowded, and sentencing and release decisions are difficult to influence (Billingsley & Haan, 1982). A reasonable option may be to examine the factors and conditions which might contribute to an exacerbation of the consequences of overcrowding. Coordinated efforts to counteract negative effects may then be possible.

The question of how overcrowding is related to prison violence is particularly critical and needs to be clarified. Studies in the area have been essentially atheoretical attempts to establish a simple link between overcrowding and increased violence without seeking to explain the factors underlying the relationship. When the effects of overcrowding have been examined in different types of institutions, it has not been done within an overriding conceptual framework (Jan, 1980; Nacci et al., 1977). Nonetheless, a careful appraisal of the literature suggests that there are at least two factors which should be taken into account: institution size and the age distribution of the population.

Several studies have reported that the incidence of violence is higher in larger than in smaller overcrowded institutions (Paulus, McCain, & Cox, 1981; Farrington & Nuttall, 1980). Prison size has also been related to an increased likelihood of riots (South Carolina Department of Corrections, 1973) and inmate homicides (Sylvester, Reed,

& Nelson, 1977). A number of studies have found that the relationship between overcrowding and rates of violence is especially strong in institutions with large proportions of younger inmates (Carr, 1980; Jan, 1980; Nacci et al., 1977). Further, age has consistently been found to be a good predictor of aggressive and disruptive conduct within prisons (Ellis, Grasmick, & Gilman, 1974; Flanagan, 1983; Jensen, 1977; Myers & Levy, 1978).

In a recent theoretical treatment of the relationship between overcrowding and prison violence, Ellis (1984) discusses how various factors might interact in mediating the relationship between social density and increased violence. It is useful to conceptualize overcrowding as having both primary and secondary consequences within prisons. Primary consequences relate to the evaluations that are made about living in a socially dense situation (Smith, 1982). As greater aversiveness is ascribed to prison living conditions, more frustration and tension is likely to occur. This psychological distress might be expressed in a variety of ways (e.g., more illness complaints; greater depression or withdrawal), depending on individual cognitive appraisals, attributions, and coping resources (Paulus, 1980; Stokols, 1980). Secondary consequences of overcrowding, on the other hand, involve changes in social control processes which can specifically undermine normal rules and norms against violence. For example, as the size of the prison population increases, surveillance becomes more difficult, infractions are less likely to be detected, and sanctions for misbehaviour may become less severe (e.g., punitive segregation

cells may already be fully occupied). Because the task of managing and controlling prisoners becomes increasingly arduous, reliance on static security and aversive forms of control increases, while the more effective dynamic forms of control become less prominent. Crowding can also affect inmate interactions in a variety of ways. Examples are the intense competition and the more widespread involvement in "cliques" that might occur as resources become increasingly scarce.

Ellis (1984) presents a comprehensive analysis of how social control processes can be affected by increased social density, and how the breakdown of social control might vary depending on the size of an institution and the age distribution of the population. He concludes that large overcrowded institutions with high proportions of young offenders are most likely to experience increases in violence. As such, he provides theoretical support for some of the research evidence which points in the same direction.

Ellis (1984) also highlights the role of inmate movement into and out of institutions as a factor which can have pervasive effects on social controls and thereby increase the likelihood of violence: for example, by increasing the frequency of territorial intrusions and disrupting trading relationships, friendships, and social hierarchies; by increasing the need for "sampling" of behavior-outcome linkages; by inhibiting the development of staff-inmate attachments. Although the likely relationship between overcrowding and increased inmate movement has been noted (Clements, 1982), the possible effects of inmate movement per se have not been investigated.

The present study was undertaken to examine the validity of Ellis' (1984) hypothesis that social control processes mediate the relationship between overcrowding and increased violence. In particular, the study had two aims. First, it was designed to examine the relationship between social density and violence in institutions that varied in size and age distribution of the population. Second, analyses were conducted to evaluate the possible independent effects of rate of inmate movement on violence.

METHOD

The sample of institutions for the study consisted of the 24 maximum and medium security penitentiaries within the Correctional Service of Canada.[1] Information regarding inmate population levels was obtained from weekly Inmate Movement and Institution Accomodation reports compiled by the Inmate Population Management Division of the Correctional Service of Canada. These reports provided figures on movement into and out of the institutions, inmate head counts, and the actual number of beds available for use after such factors as renovations, repairs, and new additions were taken into account. For each institution, weekly inmate count and capacity figures were averaged for each month for the 42 month period from January 1, 1980 to June 30, 1983. A monthly social density or "crowding index" was calculated for each institution by dividing the average inmate count by that month's institutional capacity. Although capacity figures remained fairly constant over time, there was sufficient fluctuation to warrant the monthly measure.

An index of inmate movement or "flow" for each institution was also calculated. This was determined by summing weekly movement into the institution with weekly movement out, dividing by the end of week head count, and multiplying the result by 100.[2] Flow was thus examined as a relative rate per 100 inmates, allowing for comparison of institutions on this index while controlling for population size. Weekly flow indices for each institution were averaged to monthly means.

Information regarding violent incidents was obtained from Severity of Incident Reports which are routinely completed by institutional preventive security officers in reporting the occurrence of any one of a range of incidents of violence. This incident information is forwarded to the national headquarters division of preventive security and used for ongoing operational performance analyses. Specific guidelines have been developed for consistent reporting of about 20 different categories of incidents. For the present research, incident categories were collapsed to form the following groupings: 1) Major Incidents Against Staff--this category included murder, attempted murder, or major assault of a staff member, hostage-takings, escapes involving violence, and major disturbances; 2) Major Assaults on Inmates--including murder, attempted murder, and severe assaults; 3) Inmate Suicide; 4) Minor Assaults on Staff Members; 5) Minor Assaults on Inmates; 6) Attempted Suicides and Self-Inflicted Injuries; and 7) Other Security Incidents--including attempted or planned escapes, non-violent escapes from escorts, fire or suspected arson, and minor disturbances.

It was considered appropriate to differentiate between major and minor forms of the same type of violence (e.g., assaults, disturbances) since major incidents occur much less frequently, are considerably more disruptive, and may be precipitated by a variety of factors unrelated to the personal or institutional strain that can be attributed to overcrowding. The criteria used to distinguish major and minor forms of the same type of violence were those which have been set out by the Correctional Service of Canada.[3] For each of the seven categories of violent incidents, monthly frequencies were calculated for each institution; rates per 100 inmates being calculated by dividing by monthly head count figures.

In addition to monthly statistics regarding institutional density and rates of violence, quarterly statistics on a number of institutional population parameters were examined. These included: 1) the age distribution of the population in each institution as assessed by the percentage of inmates under 24 years of age; 2) the percentage of inmates who were single versus either currently or previously married (i.e., divorced or separated); 3) the percentage of inmates who were not caucasian (i.e., native indian, asiatic, or black); 4) the percentage of inmates who had a prior penitentiary commitment; and 5) the percentage of inmates whose current major offense was violent. Several general institutional characteristics were also examined. These included: 1) security level (maximum - S6, high medium - S5, and low medium - S4); 2) the age of the institution; 3) the reported per diem expense per inmate; and 4) the designed capacity of the institution.

RESULTS

Overcrowding, Age, and Prison Size

Overall, the inmate population in the 24 institutions that were examined increased by 38.5% during the 42 month period of the study. The largest increase occurred in 1982 when the size of the population rose by 11.9%, from 7552 at the beginning of the year to 8457 at the end. Nine of the 24 institutions were operating above capacity by the end of 1982, and another eleven institutions were operating at very close to capacity (i.e., a crowding index of .95 or greater). By the middle of 1983, 14 of the 24 institutions were operating above capacity, all but 7 of the institutions had instituted a policy of "double-bunking" in cells designed for single occupancy, and a total of 750 inmates were double-bunked across the system. Although the problem of overcrowding did not reach the severe proportions experienced by other jurisdictions (Mullen & Smith, 1980), programming and other resources were considerably taxed since the influx of offenders was both sudden and unpredicted.

Annual rates of occurrence per 100 inmates for the various categories of violent incidents over the 42 month period of the study are shown in Table 1. Despite the substantial increase in the size of the inmate population, a trend towards an increasing incidence of

TABLE 1

ANNUAL RATES PER 100 INMATES FOR INCIDENTS OF VIOLENCE ACROSS INSTITUTIONS

Incident Category	Year			
	1980	1981	1982	1983
major incidents against staff	1.20	.77	.77	.38
major assaults on inmates	.66	.95	.62	.82
suicide	.16	.15	.14	.24
minor assaults on staff	.79	1.03	1.07	1.27
minor assaults on inmates	1.75	2.44	2.93	3.29
self-inflicted injuries/ attempted suicides	4.13	3.88	3.77	2.93
other security incidents	3.89	4.44	4.37	3.87
Average Total Population	6223	6503	7669	8318

Note. Rates of violence determined by dividing by the annual average total population calculated as the mean of end of week inmate count figures across institutions. Rates for 1983 represent an adjustment of data obtained for the first six months of the year.

violence across the system is evident only for the categories of minor assaults on staff and minor assaults on inmates. The increase in the rate of assaults on inmates was particularly large, almost doubling over the time period. These findings support previous reports of a strong relationship between overcrowding and increased assaultive behavior (McCain et al., 1980; Nacci et al., 1977). A trend towards increases in the rates of other categories of violence was not found. For example, as is shown in Table 1 the rate for the general category of major incidents of violence against staff actually decreased over the period. The other categories of violence showed either a general decline (i.e., self-inflicted injuries/attempted suicides), or an inconsistent trend over the period (i.e., suicide, major assaults on inmates, other security incidents).

Across system analyses therefore suggested that increased crowding may be related to overall increases in only one form of violence, namely assaultive behavior. Of course, such aggregate analyses cannot establish that increases in violence are specifically related to the consequences of overcrowding. For example, not all crowded institutions may be experiencing an increase in violence, and greater increases in violence may be occurring in some institutions that are not crowded relative to other institutions that are crowded. The theoretical framework adopted for this study postulates that the relationship between overcrowding and violence is mediated by the disruption of social control processes within institutions. It is

suggested that such disruption is more likely to occur in institutions that are relatively large and that have a high proportion of young offenders. A relationship between increased crowding and incidents of violence would thus be predicted to be particularly strong in these types of institutions.

In order to test the validity of this hypothesis, the institutions that were included in the present study were classified according to: 1) degree of overcrowding--the institution had to have exceeded capacity during the study period (n = 15); 2) size--an institution was considered "large" if its capacity was 400 or greater (n = 13); and 3) age distribution of the population--institutions were considered to have "young" populations if the proportion of inmates under 24 years of age exceeded 30% (n = 14). A crowding-incident relationship was defined as a significant correlation over the 42 month study period between an institution's monthly crowding index and any one or more of the rates for the various categories of violence that were examined.

The three categories of major incidents of violence (i.e., major incidents against staff, major assaults on inmates, and suicide) did not correlate with crowding in any of the institutions. This may be due in part to the relative infrequency of major acts of violence, although it is probable that such extreme violence as murder or hostage-taking may have a variety of specific situational determinants unrelated to overcrowding. In any case, the presentation of results which follows focuses on the remaining four categories of violent

incidents: assaults on staff, assaults on inmates, self-inflicted injuries and attempted suicides, and other security incidents.

Table 2 presents basic descriptive information for each of the institutions, as well as the correlations that were obtained between crowding and rates of violence. The top portion of the table lists those institutions that satisfied the specified criteria of crowding, size, and age distribution. It was predicted that each of these institutions would show a crowding-incident relationship. Of the seven institutions, six showed significant correlations between crowding and one or more of the categories of violence. The middle portion of the table lists those institutions that had exceeded capacity (and were thus crowded), but that did not meet one or both of the size and age distribution criteria. Of the nine institutions in this category, five showed significant correlations between crowding and rates of violence. However, in four of these cases the correlation was negative rather than positive. A positive crowding-incident relationship was found for only one of the nine institutions that were crowded but did not meet the criteria of size and/or age distribution. Finally, the bottom portion of Table 2 shows the results for those eight institutions that had not exceeded capacity during the study period. Five of these institutions were classified as maximum security. Although a significant negative correlation between crowding and violence was found in two cases, no significant positive correlations between crowding and rates of violence were noted in any of these eight institutions.

TABLE 2

BASIC DESCRIPTIVE INFORMATION FOR INSTITUTIONS AND CORRELATIONS BETWEEN CROWDING INDEX AND RATES OF VIOLENCE OVER 42 MONTHS

Institution	Security Level	Capacity	% Pop. < 24	Crowding Index Range	Assaults on Inmates	Assaults on Staff	Self-Directed Violence	Other Security Incidents
				A. Large, Crowded Institutions with Youthful Populations				
1. Springhill	4	442	56	.86 - 1.07	.08	---	.13	.04
2. Cowansville	5	442	34	.82 - 1.01	.42**	---	.14	.08
3. Leclerc	4	483	34	.93 - 1.03	.23	.31*	-.26	-.14
4. Collins Bay	5	436	33	.73 - 1.00	.55***	.04	-.13	.45**
5. Warkworth	4	408	42	.89 - 1.11	.14	---	.01	.38**
6. Stony Mountain	5	470	40	.71 - 1.06	.31*	.54**	.04	.21
7. Drumheller	4	453	45	.71 - 1.06	.11	.28	.22	.30*
				B. Other Crowded Institutions				
1. Fed. Tr. Centre	4	377	64	.89 - 1.07	---	---	-.12	-.31*
2. Kingston	6	296	24	.84 - 1.06	---	---	-.09	-.02
3. Joyceville	5	454	23	.74 - 1.09	.06	---	-.33*	.10
4. Saskatchewan	6	430	28	.72 - 1.08	---	.14	.13	-.14
5. Edmonton	6	192	34	.45 - 1.07	.19	.28	.39**	.00
6. Kent	6	180	22	.65 - 1.16	.22	-.14	-.08	-.38**
7. Matsqui	5	340	28	.51 - 1.12	-.06	.03	.11	-.33*
8. Mountain	4	187	12	.81 - 1.06	.09	---	.18	.01
9. Mission	4	180	18	.93 - 1.17	.12	.02	-.01	.07
				C. Institutions that did not Exceed Capacity				
1. Dorchester	6	449	35	.74 - .96	-.02	-.20	-.11	.22
2. Corr. Dev. Centre	6	140	34	.56 - .97	-.07	---	.22	-.12
3. Archambault	6	427	41	.63 - .96	.20	-.04	.09	-.16
4. Laval	6	604	33	.67 - .92	.13	.06	-.28	.06
5. Lamacaza	4	172	28	.85 - .96	---	---	-.41**	-.05
6. Millhaven	6	400	27	.62 - .93	-.12	.27	-.07	-.39**
7. Bowden	4	160	36	.74 - .99	---	---	---	-.17
8. Willian Head	4	150	20	.69 - .99	---	---	-.14	---

Note. Correlations with rates of violence are not shown if less than six incidents were reported.
*p < .05 **p < .01 ***p < .001

In summary, a positive crowding-incident relationship was predicted for seven of the 24 institutions. The results confirmed the predictions in six of the seven cases. No positive crowding-incident relationship was predicted for 17 of the institutions, and none was found for 16. This represents an overall positive hit-rate of 91.7%. The one institution out of seven that did not demonstrate a predicted crowding-incident relationship (i.e., Springhill) had surpassed capacity only in the second quarter of 1983; this may explain why it did not yet show a crowding effect. The single institution that could be categorized as a false negative (i.e., Edmonton) was unusual in that, in spite of its small size, it had the second highest rate of inmate turnover of any institution in the sample (results relating high inmate turnover to increased violence will be presented later). It is also interesting to note that the significant crowding-incident relationship for Edmonton institution was obtained for the category of self-directed violence; a similar relationship was not found for any other institution.

Crowding and Rate of Inmate Movement

As was noted in the introduction, it can be expected that as crowding increases, so does the flow of inmates into and out of institutions. Over the 42 month period examined in the present study, it was found that the average monthly total population of the institutions correlated .43 ($p < .01$) with the average rate of inmate flow. This supports the contention that increases in the number of

inmates a system must accomodate leads not only to institutional overcrowding but also to a proportionately greater amount of inmate movement.

Theoretically, a strong case can be made that inmate movement increases the likelihood of violence because of the generally disruptive effects that such movement has on social control processes within an institution (Ellis, 1984). Indeed, it may be that when overcrowding is relatively widespread, what distinguishes those institutions that are most violent is the amount of inmate movement rather than the degree of crowding. No study to date has examined this possibility. The analyses that are presented below sought to determine the relative importance of degree of crowding and rates of inmate movement in acounting for the incidence of violence within institutions. Other characteristics of institutions (e.g., security level, size), and a range of inmate population parameters (e.g., age distribution, proportion of violent offenders) that could be expected to relate to prison violence were also examined.

The analyses were restricted to data for 1982 since this was the period when the largest increases in crowding occurred. Average rates of violence over this period were calculated for each institution. Similarly, average crowding and inmate flow indices were determined for each institution. The values for the various population parameters were based on the mean of quarterly statistics.

Table 3 shows the correlations that were obtained between institutional rates of violence and the overcrowding and rate of inmate flow indices. As can be seen by examining the pattern of correlations, those institutions with the highest rates of inmate flow also had the highest rates of violence ($r = .47$ for assaults on inmates, $r = .58$ for assaults on staff, $r = .57$ for self-directed violence, and $r = .41$ for other security incidents). In contrast, it was found that those institutions that were more crowded actually experienced lower rates of violence. The negative relationship was significant for both assaults on inmates ($r = -.41$) and self-directed violence ($r = -.49$). Interestingly, a negative relationship was found between overcrowding and inmate flow (-.39) indicating a greater degree of inmate movement for those institutions that were less crowded. What this suggests is that system overcrowding forces those institutions that are least crowded to receive and transfer out inmates at a high rate (i.e., in order to accomodate those inmates who would otherwise be transferred to overcrowded facilities). As the correlations in Table 3 suggest, an unfortunate consequence may be that this high rate of movement may increase the likelihood of violence.

It could be argued that the relationships between inmate flow and violence are spurious and actually caused by the common influence of other variables. For example, higher security level institutions may have both higher rates of violence and higher rates of inmate flow, thus accounting for the relationship between flow and violence. As is shown in Table 3, security level, per diem cost, and several of the

TABLE 3

CORRELATIONS OF INSTITUTIONAL RATES OF VIOLENCE WITH CROWDING, FLOW, AND OTHER INSTITUTIONAL AND POPULATION PARAMETERS

	Assaults on Inmates	Assaults on Staff	Self-Directed Violence	Other Security Incidents
Crowding	-.41*	-.35	-.49*	-.39
Flow	.47*	.58**	.57**	.42*
Institutional Characteristics				
Security Level	.27	.33	.66***	.30
Age	-.04	-.18	.01	.16
Per Diem Cost	.24	.53**	.63***	.36
Designed Capacity	.19	-.20	-.02	-.03
Population Parameters				
% < 24 yrs	.15	-.06	.02	-.02
% single	-.33	.03	-.21	-.19
% not caucasian	.03	.37	.09	-.17
% with prior pen.	.30	.42*	.52**	.54**
% with viol. offense	.16	.32	.62***	.16

Note. Monthly figures averaged for 1982 for crowding index, flow index, and rates of violence. Values for population parameters calculated as the mean of quarterly statistics.

* $p < .05$ ** $p < .01$ *** $p < .001$

population parameters (i.e., proportion of inmates with prior penitentiary experience, proportion whose major offense was violent) also correlated significantly with some of the categories of violence. Partial correlations were therefore computed in order to examine the relationships between flow and violence, while statistically controlling for the possible influence of other variables. These correlations are shown in Table 4. It can be seen that the relationships between flow and violence remain strong, and in some cases are actually strengthened. Even when simultaneously controlling for all of the other factors that were examined, the only relationship which was substantially reduced was that between flow and the rate of assaults on staff. The relationship between flow and assaults on inmates was somewhat strengthened (from .47 to .54). Although not shown in Table 4, it is worth noting that the partial correlations between crowding and rates of violence remained negative. For example, when controlling for all other factors, crowding correlated -.24 with assaults on inmates, -.44 with assaults on staff, -.27 with self-directed violence, and .03 with other security incidents.

These findings support the conclusion that the amount of inmate movement may play a more critical role than the degree of crowding in increasing the likelihood of violence. Of course, the data do not address the question of the direction of the relationship between flow and violence. It may be that increased violence leads to greater inmate movement (e.g., transfers to higher security) rather than vice versa. Examination of rates of flow and violence over time within

TABLE 4

PARTIAL CORRELATIONS OF INMATE FLOW WITH RATES OF VIOLENCE CONTROLLING FOR OTHER FACTORS

Factor Controlled	Assaults on Inmates	Assaults on Staff	Self-Directed Violence	Other Security Incidents
Crowding	.39	.53	.50	.34
Security Level	.42	.54	.51	.36
Capacity	.63	.56	.62	.45
Age Distribution of Population	.51	.58	.58	.42
Proportion Pop. with prior Pen. Experience	.39	.48	.44	.23
Proportion Pop. with Violent Offenses	.46	.59	.65	.41
All Factors	.54	.12	.34	.41

institutions did not support this explanation. Although rates of violence fluctuated from month to month, it was noted that flow remained quite constant over the period for particular institutions. In other words, some institutions sustained high levels of inmate movement regardless of month to month fluctuations in the incidence of violence.

DISCUSSION

The results of this study support the conclusion that overcrowding will not affect all prisons uniformly. Following the theoretical framework put forth by Ellis (1984), it was hypothesized that a relationship between increased social density and violence would be found in those institutions that were relatively large and had a high proportion of younger offenders. Of the 24 institutions that were studied, a crowding-incident relationship was found in six of the seven institutions that met the specified criteria of size and age distribution. Nine of the institutions that had exceeded capacity did not meet the criteria of size and age distribution. Although these institutions were generally the most crowded within the system, only one significant positive correlation between density and violence was found; in a number of cases an increase in density was found to relate to <u>decreases</u> in rates of violence.

The findings regarding the moderating effects of size and age distribution clarify some inconsistencies in the literature. For

example, Nacci et al.(1977) on the basis of results which showed a higher correlation between assault categories and density in young-adult than in juvenile-youth institutions, concluded that density and assaultiveness were not related to offender age. However, juvenile-youth institutions in their sample were substantially less crowded than were those for young-adults (1.03 vs. 1.13). In addition to being more crowded, it is possible that institutions for young-adults were generally larger than those for juveniles; unfortunately, information on institutional capacity was not included in their report.

For those institutions that were large and had high proportions of younger offenders, but which had not exceeded capacity (bottom portion of Table 2), no relationship between increased density and violence was found. It may be that social density has to reach a certain threshold before a "crowding effect" occurs. It may also be that a high level of density must be maintained for some time before the disruptive effects of crowding will be experienced. When high density has not been a chronic problem, or when "high" density levels are less than capacity, it may be misleading to suggest that the effects of overcrowding are being investigated (Bonta & Nanckivell, 1980).

It is noteworthy that when a predicted crowding-incident relationship was found, it occurred for different forms of violence in different institutions. Three institutions showed a significant relationship between crowding and assaults on inmates, two between

crowding and assaults on staff, and three between crowding and the category of other security incidents. Only two of the institutions where a crowding effect was predicted showed a relationship between crowding and increases in more than one form of violence; the other four institutions showed a significant relationship between crowding and increases in only one form of violence. These findings suggest that overcrowding may have a differential effect, exacerbating particular kinds of violence depending on other characteristics of the institution, security measures and the nature of social control processes, and the type of inmate population.

In six cases where a crowding-incident relationship was not predicted, significant negative correlations were obtained between crowding and rates of violence: four with the category of other security incidents and two with self-directed violence. The presence of negative correlations underscores the complexity of the crowding phenomenon. Clearly, analyses that collapse the data across institutions, and thereby disregard valuable information about the context of crowding effects, may mask important relationships which exist under specific institutional conditions.

In addition to the factors of prison size and age distribution, the findings of the study suggest that the degree of inmate movement may also moderate the effects of overcrowding. The results indicate that once institutions have reached a certain level of social density, the rate of inmate movement can greatly exacerbate the problem of violence. A number of investigators have discussed the potentially

disruptive effects of high rates of inmate movement (Clements, 1982; Colvin, 1981; Ellis, 1984; Kassenbaum, Ward, & Wilner, 1971; Paulus et al., 1980). However, no previous study has examined the effects of inmate movement as distinct from overcrowding. As expected, it was found that as the size of the total inmate population increased so did the rate of inmate movement. During the period when most institutions were above or very close to capacity, institutional rates of violence were found to correlate significantly with rates of inmate flow. These relationships were obtained even when controlling for the influence of such institutional factors as security level and such population parameters as the proportion of inmates convicted of violent offenses. Of particular interest is the fact that greater inmate flow was associated with each of the categories of violence that were examined: assaultive, self-directed, and less focused forms of violence (e.g., minor disturbances, arson) were all more likely to occur. These findings provide strong support for Ellis' (1984) hypothesis that inmate movement will increase the likelihood of violence because of the widespread disruption of social control processes within an institution.

Taken together, the findings of the study have some important implications for correctional policy and management. Overcrowding has now become a persistent problem for many correctional jurisdictions. Setting aside the exceedingly complex issue of how to reduce the size of prison populations, it may be helpful to develop strategies to counteract and minimize the deleterious effects of overcrowding. For example, in order to reduce the incidence of violence, attempts could

be made to avoid increasing the social density in larger institutions that have high proportions of younger offenders. A systematic effort could be made to gradually change the age composition of institutions (Mabli, Holley, Patrick, & Walls, 1979); for example, by distributing younger offenders who are entering the system across institutions rather than concentrating them in one or two. If new institutions must be built, they should be relatively small in size, or divided into physically discrete and independently functioning sections. They should also be designed to accomodate offenders varying in age.

If the effects of overcrowding are mediated by a disruption of social control processes, then every attempt should be made to maintain effective social control despite increases in population size. This might include training of staff members to help them cope with overcrowding and increase sensitivity to changes in their own behavior that might reduce control. Inmates could be encouraged to play a more active and formal role in conflict management and crisis intervention (Johnson, 1979; Johnson & Toch, 1982). Rather than reduce programming, increased recreation and other forms of diversion should be provided. Use of all available space should be maximized, "sanctuaries" for quiet retreat should be established (Toch, 1977), and minor structural modifications should be made to increase perceptions of space, and enhance the effectiveness while reducing the obtrusiveness of surveillance.

Finally, the results suggest that efforts should be made to monitor the flow of inmates and maintain an equilibrium across

institutions. As has been noted by Clements (1982), overcrowding within a system leads to disorganization of normal institutional placement procedures and a high rate of overclassification and mismatching of offenders with facilities and programs. These errors eventually will result, in one way or another, in even more inmate movement. There is evidence that adhering to objective initial placement criteria can result in both an overall "downshifting" of inmates to lower security facilities and a significant reduction in the number of institutional transfers (Levinson & Ingram, 1983). Despite overcrowding, correctional jurisdictions should attempt to stabilize rates of inmate flow and strive to maintain an optimal matching of offenders to institutions.

The limitations of this study should be noted. Although the findings support Ellis' (1984) social control hypothesis, no direct assessment was made of how overcrowding affects social control processes. Also, since the study examined only officially recorded incidents of violence, it is possible that some of the increases in violence may be due to changes in the reporting behavior of staff members rather than the disruptive effects of overcrowding. However, it is not likely that reporting behavior would vary systematically with such factors as prison size, age distribution of the population, and the rate of inmate movement. Nevertheless, the findings need to be replicated through a study which would involve collecting self-report data from staff and inmates, on both incidents of violence and perceived changes in formal and informal social control strategies.

NOTES

1. Four institutions were not included in the study; three regional psychiatric centres and a regional reception centre. Two institutions were excluded from the 1980 and the first half of 1981 statistics due to the fact that their status changed to Protective Custody institutions in mid 1981. All of the institutions that were examined had similar types of living quarters: individual cells designed for single occupancy and providing about 60 sq. ft. of living space. Increases in population size above capacity were accomodated through double-bunking.

2. Movement into and out of institutions was defined as including all inter-institutional transfers and all admissions and releases. It did not include inmate movement resulting from escorted or unescorted temporary absence passes.

3. The Correctional Service of Canada defines a major assault as one where injury to the victim was of a serious nature (e.g., cuts requiring sutures, broken bones), attendance of a medical doctor and hospitalization other than for immediate treatment or observation is required, the victim is unable to continue normal routine, and a criminal investigation is considered. A major disturbance is defined as one where the day to day activity of the institution is adversely affected to a significant degree by inmate violence, necessitating the return of the inmate population to lock-up conditions. Such resistances as work stoppages or hunger strikes would normally be classed as minor disturbances unless actual violent behaviour results.

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